## **AMENDMENTS**

## In the Claims

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- 2.(canceled)
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- 4 (canceled)
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- 7.(canceled)
- 8.(canceled)
- 9.(canceled)
- A composition comprising a polymerizing agent including a molecular 10.(currently amended) 1
- tag covalently bonded to a site on the polymerizing agent and a monomer including a molecular tag, 2
- where at least one of the tags has a fluorescence property that undergoes a change before, during 3
- and/or after each of a sequence of monomer incorporations due to an interaction between the 4
- polymerizing agent tag and the monomer tag and where the polymerizing agent lacks 3' to 5' 5
- exonuclease activity. 6
- 11.(canceled) 1
- 2 12.(canceled)
- The composition of claim 10, wherein the polymerizing agent is a 13.(currently amended) 1
- polymerase lacking 3' to 5' exonuclease activity or reverse transcriptase lacking 3' to 5' exonuclease 2
- 3 activity.
- The composition of claim 13, wherein the polymerase is selected from 14.(currently amended) 1
- the group consisting of Taq DNA polymerase I lacking 3' to 5' exonuclease activity, T7 DNA 2
- polymerase lacking 3' to 5' exonuclease activity, Sequenase lacking 3' to 5' exonuclease activity, and 3
- the Klenow fragment from E. coli DNA polymerase I lacking 3' to 5' exonuclease activity. 4

The composition of claim 13, wherein the reverse transcriptase 15.(currently amended) 1 comprises HIV-1 reverse transcriptase <u>lacking 3' to 5' exonuclease activity</u>. 2 The composition of claim 10, wherein each of the monomers 16.(previously presented) 1 comprises a deoxynucleotide triphosphate (dNTP) and the monomer tag is covalently bonded to the 2 B or y phosphate group of each dNTP. 3 The composition of claim 10, wherein the tags comprise fluorescent 17.(previously presented) 1 tags and the fluorescence property comprises an intensity and/or frequency of emitted fluorescent 2 3 light. The composition of claim 17, wherein the fluorescence property is 18.(previously presented) 1 fluorescence resonance energy transfer (FRET) where either the monomer tag or the polymerase tag 2 comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two 3 tags are in close proximity. 4 The composition of claim 14, wherein the polymerase comprises Taq 19.(previously presented) 5 DNA polymerase I having a tag attached to an amino acid at a specific amino acid position of the 6 Taq DNA polymerase I, where the amino acid position is selected from the group consisting of 513-7 518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule. 8 20.(canceled) 21.(canceled) 22.(canceled) 23.(canceled) 24.(canceled) 25.(canceled) 26.(canceled) 27.(canceled)

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- 50.(currently amended) A composition comprising a polymerizing agent including a molecular tag covalently bonded to a site on the polymerizing agent and a deoxynucleotide triphosphate (dNTP) including a molecular tag covalently bonded to the β and/or γ phosphate group of the dNTP, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of monomer incorporations due to an interaction between the polymerizing agent tag and the dNTP tag.
- 1 51.(previously presented) The composition of claim 50, wherein the polymerizing agent is a

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| 2 | polymerase or reverse transc  | riptase.  |
|---|-------------------------------|---|
| 1 | 52.(previously presented)     | The composition of claim 51, wherein the polymerase is selected from      |
| 2 | the group consisting of Taq 1 | DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow            |
| 3 | fragment from E. coli DNA     | polymerase I.   |
| 1 | 53.(previously presented)     | The composition of claim 51, wherein the reverse transcriptase            |
| 2 | comprises HIV-1 reverse tra   | nscriptase.   |
| 1 | 54.(previously presented)     | The composition of claim 50, wherein the tags comprise fluorescent        |
| 2 | tags and the fluorescence pro | operty comprises an intensity and/or frequency of emitted fluorescent     |
| 3 | light.                        |   |
| 1 | 55.(previously presented)     | The composition of claim 54, wherein the fluorescence property is         |
| 2 | fluorescence resonance energ  | gy transfer (FRET) where either the monomer tag or the polymerase tag     |
| 3 | comprises a donor and the o   | ther tag comprises an acceptor and where FRET occurs when the two         |
| 4 | tags are in close proximity.  |   |
| 5 | 56.(previously presented)     |   |
| 6 | DNA polymerase I having a     | tag attached to an amino acid at a specific amino acid position of the    |
| 7 | Tag DNA nolymerase I whe      | ere the amino acid position is selected from the group consisting of 513- |

A composition comprising a polymerizing agent including a molecular tag covalently 1 57.(new) bonded to a site on the polymerizing agent and a deoxynucleotide triphosphate (dNTP) including a 2 molecular tag covalently bonded to the  $\beta$  phosphate group of the dNTP, where at least one of the tags 3 has a fluorescence property that undergoes a change before, during and/or after each of a sequence 4 of monomer incorporations due to an interaction between the polymerizing agent tag and the dNTP 5 tag.

518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.

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The composition of claim 57, wherein the polymerizing agent is a polymerase or 1 58.(new)

| 2 reverse tr | anscriptase. |
|--------------|--------------|
|--------------|--------------|

- 1 59.(new) The composition of claim 58, wherein the polymerase is selected from the group
- 2 consisting of Taq DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment
- 3 from E. coli DNA polymerase I.
- 1 60.(new) The composition of claim 58, wherein the reverse transcriptase comprises HIV-1
- 2 reverse transcriptase.
- 1 61.(new) The composition of claim 57, wherein the tags comprise fluorescent tags and the
- 2 fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.
- 1 62.(new) The composition of claim 61, wherein the fluorescence property is fluorescence
- 2 resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises
- a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in
- 4 close proximity.
- 5 63.(new) The composition of claim 59, wherein the polymerase comprises Taq DNA
- 6 polymerase I having a tag attached to an amino acid at a specific amino acid position of the Taq
- 7 DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518,
- 8 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.
- 1 64.(new) A composition comprising a polymerizing agent including a molecular tag covalently
- bonded to a site on the polymerizing agent and a deoxynucleotide triphosphate (dNTP) including a
- 3 molecular tag covalently bonded to the γ phosphate group of the dNTP, where at least one of the tags
- 4 has a fluorescence property that undergoes a change before, during and/or after each of a sequence
- of monomer incorporations due to an interaction between the polymerizing agent tag and the dNTP
- 6 tag.
- 1 65.(new) The composition of claim 64, wherein the polymerizing agent is a polymerase or
- 2 reverse transcriptase.

| 1 | 66.(new)   | The composition of claim 65, wherein the polymerase is selected from the group      |  |  |
|---|--|---|--|--|
| 2 | consisting of Taq DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragm           |   |  |  |
| 3 | from E. coli DNA polymerase I.   |   |  |  |
| 1 | 67.( <b>new</b> )  | The composition of claim 65, wherein the reverse transcriptase comprises HIV-1      |  |  |
| 2 | reverse tran   | scriptase.  |  |  |
| 1 | 68.(new)   | The composition of claim 64, wherein the tags comprise fluorescent tags and the     |  |  |
| 2 | fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.      |   |  |  |
| 1 | 69.(new)   | The composition of claim 68, wherein the fluorescence property is fluorescence      |  |  |
| 2 | resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comp         |   |  |  |
| 3 | a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are      |   |  |  |
| 4 | close proxi  | mity.   |  |  |
| 5 | 70.(new)   | The composition of claim 66, wherein the polymerase comprises Taq DNA               |  |  |
| 6 | polymerase I having a tag attached to an amino acid at a specific amino acid position of the     |   |  |  |
| 7 | DNA polymerase I, where the amino acid position is selected from the group consisting of 513-51  |   |  |  |
| 8 | 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.     |   |  |  |
| 1 | 71.(new)   | A composition comprising a polymerizing agent including a molecular tag covalently  |  |  |
| 2 | bonded to a  | a site on the polymerizing agent and a monomer including a molecular tag covalently |  |  |
| 3 | bonded to the terminal phosphate of the monomer, where at least one of the tags has a fluorescen |   |  |  |
| 4 | property th  | at undergoes a change before, during and/or after each of a sequence of monome      |  |  |
| 5 | incorporations due to an interaction between the polymerizing agent tag and the monomer tag.     |   |  |  |
|   |  |   |  |  |

The composition of claim 71, wherein the polymerizing agent is a polymerase or

The composition of claim 72, wherein the polymerase is selected from the group

72.(new)

73.(new)

reverse transcriptase.

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- 2 consisting of Taq DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment
- 3 from E. coli DNA polymerase I.
- 1 74.(new) The composition of claim 72, wherein the reverse transcriptase comprises HIV-1
- 2 reverse transcriptase.
- 1 75.(new) The composition of claim 71, wherein each of the monomers comprises a
- deoxynucleotide triphosphate (dNTP) and the monomer tag is covalently bonded to the terminal
- 3 phosphate group of each dNTP.
- 1 76.(new) The composition of claim 75, wherein the tags comprise fluorescent tags and the
- 2 fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.
- 1 77.(new) The composition of claim 76, wherein the fluorescence property is fluorescence
- 2 resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises
- a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in
- 4 close proximity.
- 5 78.(new) The composition of claim 73, wherein the polymerase comprises Taq DNA
- 6 polymerase I having a tag attached to an amino acid at a specific amino acid position of the Taq
- 7 DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518,
- 8 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.
- 1 79.(new) A composition comprising a polymerizing agent including a molecular tag covalently
- bonded to a site on the polymerizing agent lacking 3' to 5' exonuclease activity and a monomer
- 3 including a molecular tag, where at least one of the tags has a fluorescence property that undergoes
- a change before, during and/or after each of a sequence of monomer incorporations due to an
- 5 interaction between the polymerizing agent tag and the monomer tag and where the site comprises
- a naturally occurring cysteine site or a cysteine replacement site in the polymerizing agent selected
- 7 so that the site is less than or equal to about 25Å from a tag on each incorporating monomer regions
- 8 and are not sites having structural/functional importance to proper functioning of the polymerizing

- 9 agent and is covalently bonded to the cysteine through its SH group.
- 1 80.(new) The composition of claim 79, wherein the site is less than or equal to about 15Å from
- 2 a tag on each incorporating monomer.
- 1 81.(new) The composition of claim 79, wherein the site is less than or equal to about 10Å from
- 2 a tag on each incorporating monomer.
- 1 82.(new) The composition of claim 79, wherein the polymerizing agent is a polymerase or
- 2 reverse transcriptase.
- 1 83.(new) The composition of claim 79, wherein the polymerase is selected from the group
- 2 consisting of Taq DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment
- 3 from E. coli DNA polymerase I.
- 1 84.(new) The composition of claim 83, wherein the reverse transcriptase comprises HIV-1
- 2 reverse transcriptase.
- 1 85.(new) The composition of claim 79, wherein each of the monomers comprises a
- 2 deoxynucleotide triphosphate (dNTP) and the monomer tag is covalently bonded to the β and/or γ
- 3 phosphate group of each dNTP.
- 1 86.(new) The composition of claim 85, wherein the tags comprise fluorescent tags and the
- 2 fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.
- 1 87.(new) The composition of claim 86, wherein the fluorescence property is fluorescence
- 2 resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises
- a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in
- 4 close proximity.
- 5 88.(new) The composition of claim 83, wherein the polymerase comprises Taq DNA

- 6 polymerase I having a tag attached to an amino acid at a specific amino acid position of the Tag
- DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518,
- 8 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.
- 1 89.(new) A composition comprising a polymerizing agent including a molecular tag covalently
- 2 bonded to a site on the polymerizing agent and a monomer including a molecular tag covalently
- 3 bonded to the terminal phosphate of the monomer, where at least one of the tags has a fluorescence
- 4 property that undergoes a change before, during and/or after each of a sequence of monomer
- 5 incorporations due to an interaction between the polymerizing agent tag and the monomer tag and
- 6 where the site comprises a naturally occurring cysteine site or a cysteine replacement site in the
- 7 polymerizing agent selected so that the site is less than or equal to about 25Å from a tag on each
- 8 incorporating monomer and is covalently bonded to the cysteine through its SH group.
- 1 90.(new) The composition of claim 89, wherein the site is less than or equal to about 15Å from
- 2 a tag on each incorporating monomer.
- 1 91.(new) The composition of claim 89, wherein the site is less than or equal to about 10Å from
- 2 a tag on each incorporating monomer.
- I 92.(new) The composition of claim 89, wherein the polymerizing agent is a polymerase or
- 2 reverse transcriptase.
- 1 93.(new) The composition of claim 92, wherein the polymerizing agent is a polymerase or
- 2 reverse transcriptase.
- 1 94.(new) The composition of claim 92, wherein the polymerase is selected from the group
- 2 consisting of Taq DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment
- 3 from E. coli DNA polymerase I.
- 1 95.(new) The composition of claim 93, wherein the reverse transcriptase comprises HIV-1
- 2 reverse transcriptase.

- 1 96.(new) The composition of claim 89, wherein each of the monomers comprises a deoxynucleotide triphosphate (dNTP) and the monomer tag is covalently bonded to the terminal phosphate group of each dNTP.
- 1 97.(new) The composition of claim 96, wherein the tags comprise fluorescent tags and the 2 fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.
- 1 98.(new) The composition of claim 97, wherein the fluorescence property is fluorescence 2 resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises 3 a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in 4 close proximity.
- 5 99.(new) The composition of claim 94, wherein the polymerase comprises *Taq* DNA polymerase I having a tag attached to an amino acid at a specific amino acid position of the *Taq* DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.